

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): A[[n]] hybrid protein consisting essentially of:
~~the fusion of an ABC transporter membrane protein, with~~
~~a spacer, and~~
~~an ATP-sensitive potassium ion channel from the Kir family ion channel which is not~~
~~naturally coupled to said ABC transporter membrane protein,~~
~~wherein said spacer is between said ABC transporter membrane protein and said~~
~~ATP-sensitive potassium channel, and~~
~~wherein said membrane protein, spacer, and potassium channel are functionally~~
~~coupled so that ligand binding to the ABC transporter membrane protein transduces a signal~~
~~to the potassium channel that produces an electrical signal.~~

Claim 2 (Cancelled).

Claim 3 (Currently Amended): The hybrid protein of claim [[2]] 1, wherein said spacer consists of six glycine or ten glutamine residues.

Claim 4 (Withdrawn): The hybrid protein of claim 1, which comprises a tag, to facilitate the detection and/or the purification of said hybrid protein.

Claim 5 (Withdrawn): The hybrid protein of claim 1, wherein said membrane protein is a receptor.

Claim 6 (Withdrawn): The hybrid protein of claim 5, wherein said receptor is an hormone receptor.

Claim 7 (Withdrawn): The hybrid protein of claim 6, wherein said hormone receptor is the M2 muscarinic receptor.

Claim 8 (Withdrawn): The hybrid protein of claim 6, wherein said hormone receptor is the $\beta 2$ adrenergic receptor.

Claim 9 (Withdrawn): The hybrid protein of claim 5, wherein said receptor is a receptor for a pollutant/contaminant.

Claim 10 (Withdrawn): The hybrid protein of claim 5, wherein said receptor is an olfactory receptor.

Claim 11-12 (Cancelled).

Claim 13 (Currently Amended): The hybrid protein of claim [[12]] 1, wherein said ABC transporter is from the MRP class.

Claim 14 (Previously Presented): The hybrid protein of claim 13, wherein said ABC transporter is CFTR.

Claim 15 (Previously Presented): The hybrid protein of claim 13, wherein said ABC transporter is MRP1.

Claim 16 (Previously Presented): The hybrid protein of claim 13, wherein said ABC transporter is YCF1.

Claim 17 (Cancelled).

Claim 18 (Previously Presented): The hybrid protein of claim [[12]] 1, wherein said ABC transporter is Mdr1.

Claim 19-23 (Cancelled).

Claim 24 (Currently Amended): The hybrid protein of claim [[23]] 1, wherein said ATP-sensitive potassium channel is Kir6.2.

Claim 25 (Currently Amended): The hybrid protein of claim 24, which is any one of SEQ ID NOS: 1 to 11.

Claim 26 (Withdrawn): The hybrid protein of claim 1, wherein said ion channel is a voltage dependent channel.

Claim 27 (Withdrawn): The hybrid protein of claim 26, wherein said voltage dependent channel is from the Kv family.

Claim 28 (Withdrawn): The hybrid protein of claim 1, wherein said ion channel is a mechanosensitive channel.

Claim 29 (Withdrawn): The hybrid protein of claim 28, wherein said mechanosensitive channel is MscL.

Claim 30 (Previously Presented): A polynucleotide encoding the hybrid protein of claim 1.

Claim 31 (Previously Presented): A polynucleotide encoding the hybrid protein of claim 25.

Claim 32 (Currently Amended): A primer ~~able to amplify the polynucleotide of claim 25, which is selected from the group consisting of [[is]] SEQ ID NOS: 13 to 16, [[and]] 21, and 22.~~

Claim 33 (Previously Presented): A recombinant vector comprising the polynucleotide of claim 30.

Claim 34 (Currently Amended): [[an]] A host cell expressing the hybrid protein of claim 1.

Claim 35 (Currently Amended): An electrical sensor comprising:
the hybrid protein of claim 1, and
a membrane,
wherein said hybrid protein is incorporated in [[a]] the membrane to form an electrical
sensor.

Claim 36 (Withdrawn): A method for the screening of an agonist of a membrane protein, comprising ~~the step of~~:

- bringing a drug to test in contact with the electrical sensor of claim 35,
- measuring the resulting electrical signal by appropriate means, and
- selecting the drugs which induce an electrical signal.

Claim 37 (Withdrawn): A method for the screening of an antagonist of a membrane protein, comprising ~~the step of~~:

- bringing a drug to test in contact with the electrical sensor of claim 35, and with a ligand/substrate of said membrane protein,

- measuring the resulting electrical signal by appropriate means, and
- selecting the drugs which block the electrical signal induced by said ligand/substrate.

Claim 38 (Withdrawn): The method of claim 36, wherein said electrical sensor comprises [[an]] a hybrid protein comprising MRP1 according to claim 15, to screen anticancer drugs or multidrug reversing agents.

Claim 39 (Withdrawn): The method of claim 37, wherein said electrical sensor comprises [[an]] a hybrid protein comprising MRP1 according to claim 15, to screen anticancer drugs or multidrug reversing agents

Claim 40 (Withdrawn): The method of claim 36, wherein said electrical sensor comprises [[an]] a hybrid protein comprising SUR according to claim 17, to screen antidiabetic, antiischemic or antihypertensive drugs.

Claim 41 (Withdrawn): The method of claim 37, wherein said electrical sensor comprises [[an]] a hybrid protein comprising SUR according to claim 17, to screen antidiabetic, antiischemic or antihypertensive drugs.

Claim 42 (Withdrawn): A method for the detection of a contaminant/pollutant, comprising the step of:

- bringing a sample to be tested in contact with the electrical sensor of claim 35,
- measuring the resulting electrical signal by appropriate means, and
- detecting the presence of said contaminant/pollutant in said sample.

Claim 43 (Withdrawn): The method of claim 42, wherein said electrical sensor comprises [[an]] a hybrid protein comprises YCF1 according to claim 16, to detect heavy metals such as nickel, cadmium, arsenite and mercury.

Claim 44 (Withdrawn): A method for assaying the activity of membrane protein, comprising the step of:

- bringing a ligand/substrate of said membrane protein in contact with the electrical sensor of claim 35, and
- measuring the resulting electrical signal by appropriate means.

Claim 45 (Currently Amended): A kit for the screening of an agonist/antagonist agonist or antagonist, or both, of a membrane protein comprising at least the electrical sensor of claim 35.

Claim 46 (Currently Amended): A kit for the detection of a contaminant/pollutant contaminant or a pollutant, or both, comprising at least the electrical sensor of claim 35.